CLAIMS

1. A peritoneal function testing method in which a ratio $MTAC_{un}/MTAC_c$ calculated using $MTAC_{un}$ and $MTAC_c$ is used as an index for a peritoneal function test, where $MTAC_{un}$ is an overall mass transfer-area coefficient for urea nitrogen and $MTAC_c$ is an overall mass transfer-area coefficient for creatinine.

2. The peritoneal function testing method of Claim 1, wherein the $MTAC_{un}$ and the $MTAC_c$ are obtained by computing Pyle-Popovich model.

3. The peritoneal function testing method of Claim 1, wherein a permeability coefficient for cell pores (L_PS_C) and an overall permeability coefficient (L_PS) are further calculated from Three-Pore Theory model while a ratio L_PS_C/L_PS calculated using the L_PS_C and the L_PS is obtained, and

the L_PS_C/L_PS ratio and the $MTAC_{un}/MTAC_c$ ratio are used as indexes for the peritoneal function test.

4. The peritoneal function testing method of Claim 3, wherein a correlation between the L_PS_C/L_PS ratio and the $MTAC_{un}/MTAC_c$ ratio is used as an index for the peritoneal function test.

5. The peritoneal function testing method of Claim 1, wherein the $MTAC_{un}/MTAC_c$ ratio and a volume of water removal are used as indexes for the peritoneal function test.

6. A peritoneal function testing method comprising:

a 1st computation step for obtaining individual initial estimate values for $MTAC_{glc}$, $MTAC_{un}$, and $MTAC_c$ by computing Pyle-Popovich model, as well as for a ratio L_PS_C/L_PS by using L_PS_C and L_PS, where $MTAC_{glc}$ is an overall mass transfer-area coefficient for glucose, $MTAC_{un}$ is an overall mass transfer-area coefficient for urea nitrogen, $MTAC_c$ is an overall mass transfer-area coefficient for creatinine, L_PS_C is a permeability coefficient for cell pores, and L_PS is an overall permeability coefficient; and

a 2nd computation step, following the 1st computation step, in which Three-Pore Theory model is computed by introducing the individual initial estimate values for the $MTAC_{glc}$, the $MTAC_{un}$, the $MTAC_c$, and the L_PS_C/L_PS ratio thereto, and an optimal solution of computation results from the Three-Pore Theory model is calculated using Genetic Algorithm, wherein

a ratio $MTAC_{un}/MTAC_c$ calculated by using an optimal $MTAC_{un}$ and an optimal $MTAC_c$ determined by the optimal solution is used as an index for a peritoneal function test.

7. The peritoneal function testing method of Claim 6, wherein

in the computation of the Pyle-Popovich model, solute concentration values for the glucose, the urea nitrogen, and the creatinine are individually calculated as approximation solutions of linear differential equations.

8. The peritoneal function testing method of Claim 7, wherein

the $MTAC_{un}/MTAC_c$ ratio and a volume of water removal are used as indexes for the peritoneal function test.

9. The peritoneal function testing method of Claim 8, wherein a correlation between the $MTAC_{un}/MTAC_c$ ratio and the volume of water removal is used as an index for the peritoneal function test.

10. A peritoneal function testing method using Three-Pore Theory model, wherein

a permeability coefficient for cell pores (L_PS_C) and an overall permeability coefficient (L_PS) are calculated while a ratio L_PS_C/L_PS calculated using the L_PS_C and the L_PS is obtained, and

the L_PS_C/L_PS ratio is used as an index for a peritoneal function test.

11. The peritoneal function testing method of Claim 10, wherein

the L_PS_C/L_PS ratio and a volume of water removal are used as indexes for the peritoneal function test.

12. The peritoneal function testing method of Claim 11, wherein

a correlation between the L_PS_C/L_PS ratio and the volume of water removal is used as an index for the peritoneal function test.

13. A peritoneal dialysis planning apparatus comprising a computation unit that performs computation using data obtained

from a dialysis patient and outputs results of the computation to an output unit, characterized by:

the computation unit calculates a ratio $MTAC_{un}/MTAC_c$ by using $MTAC_{un}$ and $MTAC_c$, where $MTAC_{un}$ is an overall mass transfer-area coefficient for urea nitrogen and $MTAC_c$ is an overall mass transfer-area coefficient for creatinine; and

the output unit outputs the $MTAC_{un}/MTAC_c$ ratio as an index for a peritoneal function test.

14. The peritoneal dialysis planning apparatus of Claim 13, wherein

the computation unit obtains the $MTAC_{un}$ and the $MTAC_c$ by computing Pyle-Popovich model.

15. The peritoneal dialysis planning apparatus of Claim 14, wherein

the computation unit further (i) calculates a permeability coefficient for cell pores (L_PS_C) and an overall permeability coefficient (L_PS) from Three-Pore Theory model, and also obtains a ratio L_PS_C/L_PS, and

(ii) makes a graph of a correlation between the L_PS_C/L_PS ratio and the $MTAC_{un}/MTAC_c$ ratio, which is output to the output unit.

16. The peritoneal dialysis planning apparatus of Claim 15, wherein

the output unit is a display unit, and

the display unit outputs the correlation by displaying a

distribution of plotted actual measurements of multiple patients and a regression line for the distribution.

17. The peritoneal dialysis planning apparatus of Claim 13, wherein

a correlation between the $MTAC_{un}/MTAC_c$ ratio and a volume of water removal is further presented in a graph, which is output to the output unit.

18. A peritoneal dialysis planning apparatus comprising a computation unit that performs computation using data obtained from a dialysis patient and outputs results of the computation to an output unit, characterized by:

the computation unit (i) obtains individual initial estimate values for $MTAC_{glc}$, $MTAC_{un}$, and $MTAC_c$ by computing Pyle-Popovich model, as well as for a ratio L_PS_C/L_PS by using L_PS_C and L_PS, where $MTAC_{glc}$ is an overall mass transfer-area coefficient for glucose, $MTAC_{un}$ is an overall mass transfer-area coefficient for urea nitrogen, $MTAC_c$ is an overall mass transfer-area coefficient for creatinine, L_PS_C is a permeability coefficient for cell pores, and L_PS is an overall permeability coefficient, then (ii) performs computation by introducing the individual initial estimate values for the $MTAC_{glc}$, the $MTAC_{un}$, the $MTAC_c$, and the L_PS_C/L_PS ratio into Three-Pore Theory model, (iii) calculates an optimal solution of computation results from the Three-Pore Theory model by using Genetic Algorithm, and furthermore (iv) calculates a ratio $MTAC_{un}/MTAC_c$ by using an optimal $MTAC_{un}$ and an optimal $MTAC_c$ determined by the optimal

solution; and

the output unit outputs the *MTACun/MTACc* ratio as an index for a peritoneal function test.

19. The peritoneal dialysis planning apparatus of Claim 18, wherein

in the computation of the Pyle-Popovich model, the computation unit calculates individual solute concentration values for the glucose, the urea nitrogen, and the creatinine as approximation solutions of linear differential equations.

20. The peritoneal dialysis planning apparatus of Claim 18, wherein

a correlation between a ratio $MTAC_{un}/MTAC_c$ calculated using the $MTAC_{un}$ and the $MTAC_c$ and a volume of water removal is further presented in a graph, which is output to the output unit.

21. The peritoneal dialysis planning apparatus of Claim 20, wherein

the output unit is a display unit, and

the display unit outputs the correlation by displaying a distribution of plotted actual measurements of multiple patients and a regression line for the distribution.

22. The peritoneal dialysis planning apparatus of Claim 18, wherein

the output unit outputs one of the $MTAC_{un}/MTAC_c$ ratio and an L_PS_C/L_PS ratio of the optimal solution, which is plotted in

a two-axes coordinate system together with a volume of water removal.

23. A peritoneal dialysis planning apparatus comprising a computation unit that computes Three-Pore Theory model using data obtained from a dialysis patient and outputs results of the computation to an output unit, characterized by:

the computation unit obtains a permeability coefficient for cell pores (L_PS_C) and an overall permeability coefficient (L_PS) as a result of the computation of the Three-Pore Theory model, and also obtains a ratio L_PS_C/L_PS; and

the output unit outputs the L_PS_C/L_PS ratio as an index of a peritoneal function test.

24. The peritoneal dialysis planning apparatus of Claim 23, wherein

a correlation between the L_PS_C/L_PS ratio and a volume of water removal is further presented in a graph, which is output to the output unit.

25. The peritoneal dialysis planning apparatus of Claim 23, wherein

the output unit outputs one of an $MTAC_{un}/MTAC_c$ ratio obtained by the computation unit and the L_PS_C/L_PS ratio, which is plotted in a two-axes coordinate system together with a volume of water removal.

26. The peritoneal dialysis planning apparatus of Claim 25,

wherein

when outputting one of the $MTAC_{un}/MTAC_c$ ratio and the L_PS_C/L_PS ratio, the output unit further presents, in the coordinate system, information indicating a peritoneal function state obtained according to the volume of water removal.

27. The peritoneal dialysis planning apparatus of Claim 26, wherein

the output unit is a display unit, and

the display unit outputs a correlation between the L_PS_C/L_PS ratio and a volume of water removal by displaying a distribution of plotted actual measurements of multiple patients and a regression line for the distribution.

28. A computer-readable recording medium having a peritoneal function testing program recorded thereon, wherein

the peritoneal function testing program executes an $MTAC_{un}/MTAC_c$ calculation step in which a ratio $MTAC_{un}/MTAC_c$ is calculated using $MTAC_{un}$ and $MTAC_c$ so as to be used as an index for a peritoneal function test, where $MTAC_{un}$ is an overall mass transfer–area coefficient for urea nitrogen and $MTAC_c$ is an overall mass transfer–area coefficient for creatinine.

29. The computer-readable recording medium of Claim 28, wherein

the peritoneal function testing program further executes an $MTAC$ calculation step in which the $MTAC_{un}$ and the $MTAC_c$ are obtained by computing Pyle-Popovich model.

30. The computer-readable recording medium of Claim 28, wherein

the peritoneal function testing program further (i) comprises an L_PS_C/L_PS calculation step in which a permeability coefficient for cell pores (L_PS_C) and an overall permeability coefficient (L_PS) are calculated from Three-Pore Theory model while a ratio L_PS_C/L_PS calculated using the L_PS_C and the L_PS is obtained, and

(ii) executes use of the L_PS_C/L_PS ratio and a volume of water removal as indexes for the peritoneal function test.

31. The computer-readable recording medium of Claim 28, wherein

the peritoneal function testing program further executes use of the $MTAC_{un}/MTAC_c$ ratio and a volume of water removal as indexes for the peritoneal function test.

32. A computer-readable recording medium having a peritoneal function testing program recorded thereon, wherein

the peritoneal function testing program comprises:

a 1st computation step for obtaining individual initial estimate values for $MTAC_{glc}$, $MTAC_{un}$, and $MTAC_c$ by computing Pyle-Popovich model, as well as for a ratio L_PS_C/L_PS by using L_PS_C and L_PS, where $MTAC_{glc}$ is an overall mass transfer-area coefficient for glucose, $MTAC_{un}$ is an overall mass transfer-area coefficient for urea nitrogen, $MTAC_c$ is an overall mass transfer-area coefficient for creatinine, L_PS_C is a permeability coefficient for cell pores, and the L_PS is an overall permeability coefficient; and

a 2nd computation step, following the 1st computation step, in which Three-Pore Theory model is computed by introducing the individual initial estimate values for the $MTAC_{glc}$, the $MTAC_{un}$, the $MTAC_c$, and the L_PS_C/L_PS ratio thereto, and an optimal solution of computation results from the Three-Pore Theory model is calculated using Genetic Algorithm, wherein

use of a ratio $MTAC_{un}/MTAC_c$, calculated using an optimal $MTAC_{un}$ and an optimal $MTAC_c$ determined by the optimal solution, as an index for a peritoneal function test is executed.

33. The computer-readable recording medium of Claim 32, wherein

the peritoneal function testing program executes, in the computation of the Pyle-Popovich model, calculation of individual solute concentration values for the glucose, the urea nitrogen, and the creatinine as approximation solutions of linear differential equations.

34. The computer-readable recording medium of Claim 32, wherein

the peritoneal function testing program further executes use of the $MTAC_{un}/MTAC_c$ and a volume of water removal as indexes for the peritoneal function test.

35. A computer-readable recording medium on which a peritoneal function testing program using Three-Pore Theory model is recorded, wherein

the peritoneal function testing program (i) comprises:

a permeability-coefficient calculation step for calculating a permeability coefficient for cell pores (L_PS_C) and

an overall permeability coefficient (L_PS); and

an L_PS_C/L_PS calculation step for calculating a ratio L_PS_C/L_PS, and

(ii) executes use of the L_PS_C/L_PS ratio as an index for a peritoneal function test.

36. The computer-readable recording medium of Claim 35, wherein

the peritoneal function testing program further executes use of the L_PS_C/L_PS ratio and a volume of water removal as indexes for the peritoneal function test.

37. A peritoneal function testing program for executing an $MTAC_{un}/MTAC_c$ calculation step in which a ratio $MTAC_{un}/MTAC_c$ is calculated using $MTAC_{un}$ and $MTAC_c$ so as to be used as an index for a peritoneal function test, where $MTAC_{un}$ is an overall mass transfer-area coefficient for urea nitrogen and $MTAC_c$ is an overall mass transfer-area coefficient for creatinine.

38. The peritoneal function testing program of Claim 37, further executing an $MTAC$ calculation step in which the $MTAC_{un}$ and the $MTAC_c$ are obtained by computing Pyle-Popovich model.

39. The peritoneal function testing program of Claim 37, further comprising:

an L_PS_C/L_PS calculation step in which a permeability coefficient for cell pores (L_PS_C) and an overall permeability coefficient (L_PS) are calculated from Three-Pore Theory model while a ratio L_PS_C/L_PS calculated using the L_PS_C and the L_PS is

obtained, wherein

use of the L_PS_C/L_PS ratio and a volume of water removal as indexes for the peritoneal function test is executed.

40. The peritoneal function testing program of Claim 37, further executing use of the $MTAC_{un}/MTAC_c$ ratio and a volume of water removal as indexes for the peritoneal function test.

41. A peritoneal function testing program comprising:

a 1st computation step for obtaining individual initial estimate values for $MTAC_{glc}$, $MTAC_{un}$, and $MTAC_c$ by computing Pyle-Popovich model, as well as for a ratio L_PS_C/L_PS by using L_PS_C and L_PS, where $MTAC_{glc}$ is an overall mass transfer-area coefficient for glucose, $MTAC_{un}$ is an overall mass transfer-area coefficient for urea nitrogen, $MTAC_c$ is an overall mass transfer-area coefficient for creatinine, L_PS_C is a permeability coefficient for cell pores, and L_PS is an overall permeability coefficient; and

a 2nd computation step, following the 1st computation step, in which Three-Pore Theory model is computed by introducing the individual initial estimate values for the $MTAC_{glc}$, the $MTAC_{un}$, the $MTAC_c$, and the L_PS_C/L_PS ratio thereto, and an optimal solution of computation results from the Three-Pore Theory model is calculated using Genetic Algorithm, wherein

use of a ratio $MTAC_{un}/MTAC_c$, calculated using an optimal $MTAC_{un}$ and an optimal $MTAC_c$ determined by the optimal solution, as an index for a peritoneal function test is executed.

42. The peritoneal function testing program of Claim 41, executing, in the computation of the Pyle-Popovich model, calculation of individual solute concentration values for the glucose, the urea nitrogen, and the creatinine as approximation solutions of linear differential equations.

43. The peritoneal function testing program of Claim 41, executing use of the $MTAC_{un}/MTAC_c$ and a volume of water removal as indexes for the peritoneal function test.

44. A peritoneal function testing program using Three-Pore Theory model, (i) comprising:

a permeability-coefficient calculation step for calculating a permeability coefficient for cell pores (L_PS_C) and an overall permeability coefficient (L_PS); and

an L_PS_C/L_PS calculation step for calculating a ratio L_PS_C/L_PS, and

(ii) executing use of the L_PS_C/L_PS ratio as an index for a peritoneal function test.

45. The peritoneal function testing program of Claim 44, executing use of the L_PS_C/L_PS ratio and a volume of water removal as indexes for the peritoneal function test.